MANUAL &

INSTALLATION INSTRUCTIONS

for

MODEL WZM-240

TRANSLATOR

DRIVE

Manual of Stepper Motor Driver of WZM-240
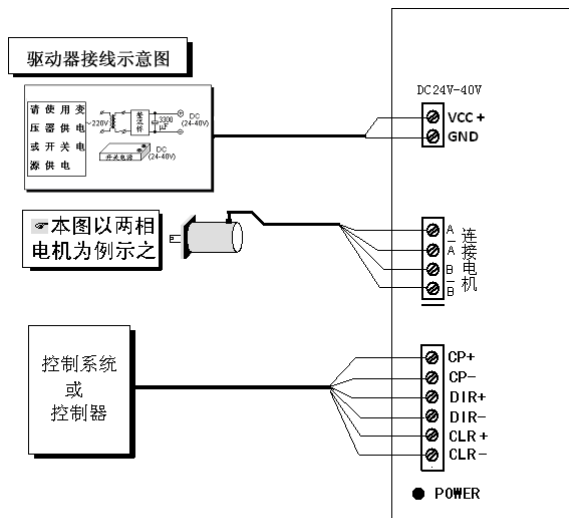
Features

1. Absolute maximum ratings

Motor Supply Voltage, VDD	:	+24V to +40V
Output Current, Iout	:	0.1A to 4.0A
Logic Input Voltage	:	0V to +7.0V
Monostable Pulse Range	:	10uS to 100mS
Junction Temperature	:	+150C

2. Internal clamp diodes
3. Low-loss current sensing method
4. Can control or change of motor current from 0.1A to +4.0A
5. TTL and CMOS compatible inputs
6. Thermal shutdown (outputs off) at Tj =155C
7. Overcurrent protection

Applications

1. Automated factory, medical and office equipment

I/0 Description

1. VCC	:	Motor Supply Voltage
2. GND	:	Motor Supply Voltage Ground
3. A+,A-,B+,B-	:	Connect to Stepper Motor
4. CP+	:	Pulse input (give it one pulse, Stepper Motor run a step)
CP-	:	Pulse input ground
5. DIR+	:	direction input (Pulling the CCW+ logic-high activates, Stepper Motor will change direction)
DIR-	:	direction input ground
6. CLR+	:	clear input (Pulling the CLR+ logic-high activates, Stepper Motor Will be free)
CLR-	:	clear input ground
7. Potentiometer	:	control or change of motor current from 0.1A to +4.0A

	Clockwise	:	current increase
	Counterclockwise	:	current decrease

9. LED	:	Power indicator light

驱动器接线示意图　Connection diagram of driver

控制系统或控制器　Control system or controller

本图以两相电机为例示之　Two phase motor as the example in this diagram

拨位设置　Step setting

连接电机　Connecting motor

Signal interface:

CP+　positive terminal of step impulse signal

CP-　Negative terminal of step impulse signal

DIR+　Positive terminal of direction level signal

DIR-　Negative terminal of direction level signal

EN+　Positive terminal of enable level signal

EN-　Negative terminal of enable level signal

CW+　Positive terminal of positive direction step impulse signal

CW-　Negative terminal of positive direction step impulse signal

CCW+Positive terminal of reverse direction step impulse signal

CCW- Negative terminal of reverse step impulse signal

Indicator :	**Power**	Power indicator (Green light)
	No ready	Not ready indicator (Red light)
Current Setting Pot:	**CW**	Increase
	CCW	Decrease
Motor interface:	$A、\overline{A}、B、\overline{B}$	
Power interface:	**DC24V-40V**　AC supply not less than **60W**. **50～60Hz** shall not be connected directly into the circuit. The voltage shall be reduced by transformer.	

2. Technical specifications

2.1 Power supply: **DC24V-40V**.

2.2 Driver motor: **42 series and 57 series.**

2.3 Drive current: In accordance with different motors, the driver shall be adjusted so that the output current is matched with the rated current of the motor. If the motor can drive the load, the output current of the driver can be adjusted to be less than the rated current of the motor, but not be larger than the rated current of the motor. **Otherwise, the motor may be overheated.**

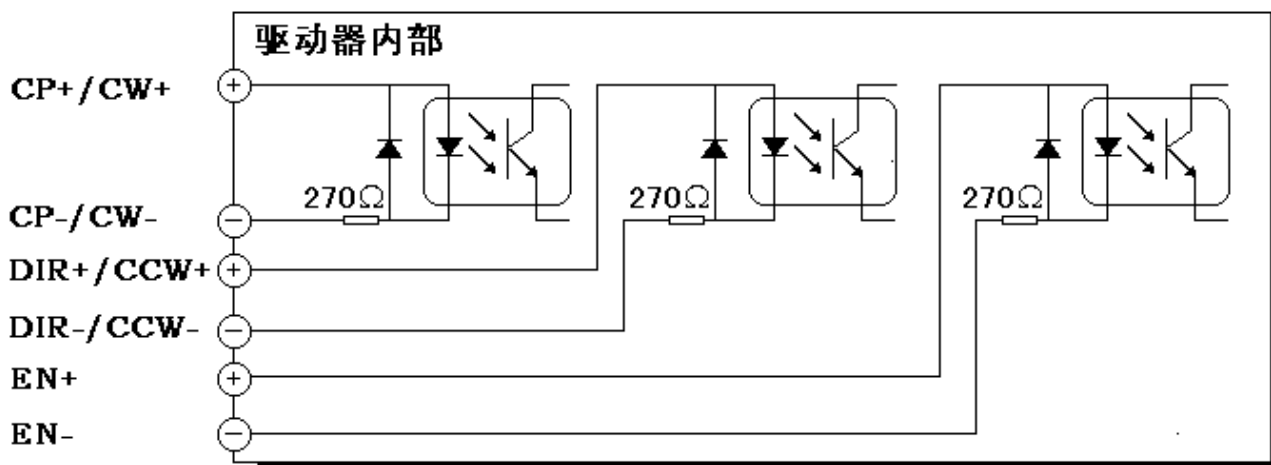2.4 Driving method: Sine wave constant current chopped wave driving.

3. Subdivide number and phase current setting:

The subdivide number and phase current are set by the step switches on the driver according to the instruction on the front panel. Under the allowable control frequency, make every effort to select high subdivide number, in this way; the motor operation will be more stable. Refer to the following table for the specific setting method:

Step number setting		
Switch 1	subdivide number	Pace angle
ON	1	1.8°
OFF	2	0.9°

4. Control signal input connection

In order that the control system and the driver can communicate normally, avoiding the interference each other, we isolate the input signal with the optical coupling device inside the driver. The internal interface circuits of three signals are same. The common mode is 1) Common anode mode: Connect **CP+**. **DIR+ and EN+** terminals together as the common anode terminal, which is then connected to the external system **+5V**. The impulse signal is connected to **CP-** terminal. The direction signal is connected to DIR**-** terminal. The enable signal is connected to **EN- terminal**. 2) Common cathode mode: Connect **CP-**. **DIR- and EN-** terminals together as the common cathode terminal, which is then connected to the external system **GND**. The impulse signal is connected to **CP+** terminal. The direction signal is connected to **DIR+** terminal. The enable signal is connected to **EN+** terminal. 3) Differential mode: Direct connection
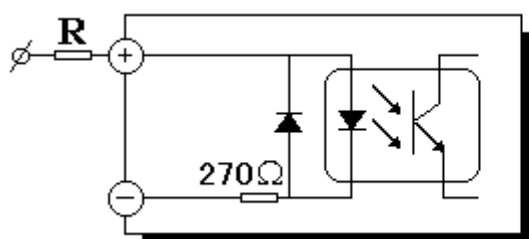
驱动器内部 Driver internal
驱动器输入信号内部接口示意图 Internal interface diagram of the driver input signals

If the voltage of the input signal exceeds +5V, the current limiting resistance R must be added in the external circuit to ensure providing 8 - 15mA drive current to the optical coupler inside the driver. See following diagram and table.

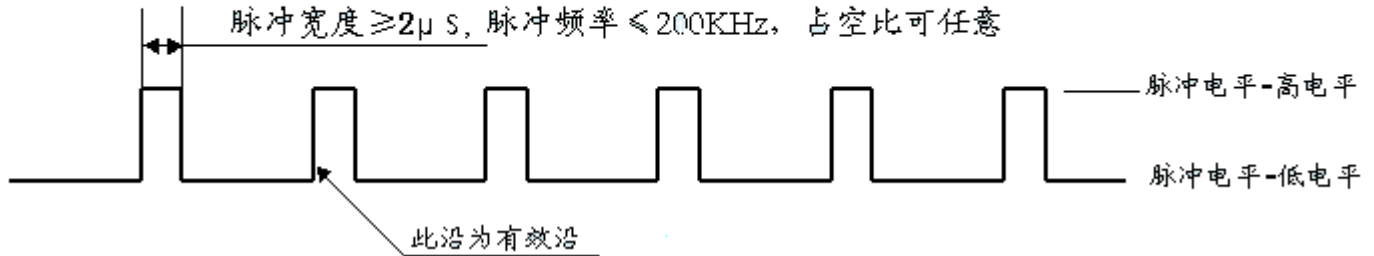| 信号幅值	外接限流电阻R
5V	不加
12V	680Ω
24V	2.0KΩ

信号幅值 voltage of signal
外接限流电阻 R External current limiting resistance R
不加 not added

4.1 Step impulse signal CP

The step impulse signal CP is used to control the position and speed of the step motor. Which is to say: Once the driver receives one CP impulse, the step motor will be driven by the driver for a pace angle (One subdivide pace angle in subdivide). The frequency change of the impulse **CP** changes the rotation speed of the step motor at the same time. The step motor could be positioned precisely by controlling the number of CP impulses. In this way, it is very convenient to realize the speed regulation and positioning of the step motor. The CP signal of the driver is low level active. The drive current required by CP signal is **8-15mA**. There is certain requirement on CP pulse width, not less than **2μS** in general (See following drawing).

脉冲信号的频率要求不大于200KHz；
脉冲信号的宽度要求不小于2μS。
脉冲信号的驱动电流要求为8-15mA

脉冲信号的频率要求不大于 200KHz.　The frequency of the impulse signal shall not be larger than 200KHz.

脉冲信号的宽度要求不小于 2μS.　The width of the impulse signal shall not be less than 2μS.

脉冲信号的驱动电流要求为 8-15mA.　The drive current of the impulse signal shall be 8-15mA.

脉冲宽度≥200KHz, 脉冲频率≤2μS, 占空比可任意. Pulse frequency ≥200KHz; Pulse width ≤2μS; Pulse duty factor is at discretion.
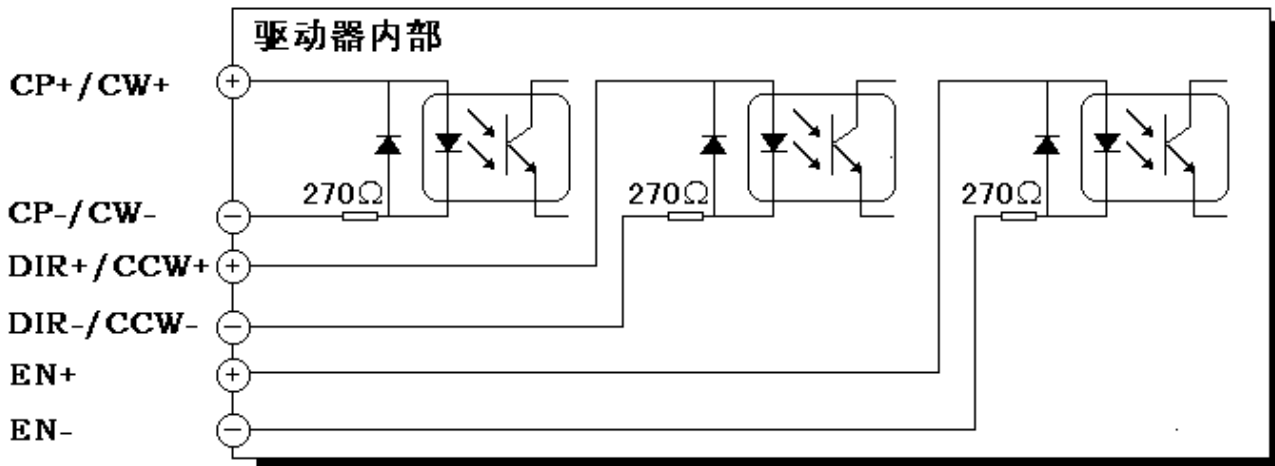
此沿为有效沿　This edge is valid edge.

脉冲电平-高电平　　Impulse level-High level

脉冲电平-低电平　　Impulse level-Lower level

4.2 Direction level signal DIR

The direction level signal DIR is used for controlling the rotation direction of the step motor. When this terminal is at high level, the motor rotates in one direction. When this terminal is at low level, the motor rotates in another direction. We call this commutation mode as single pulse mode. In addition, there is two pulse commutation mode: The driver receives the impulse signal from two circuits (Marked as **CW** and **CCW**). When one circuit (such as CW) has impulse signal, the motor rotates in positive rotation. When another circuit (such as CCW) has impulse signal, the motor rotates in reversal direction. The 5th step switch decides which state is used. The rotation direction of the motor can be changed only after the motor stops. The commutation signal must be issued after the last CP impulse in previous direction is finished and before the first CP impulse in another direction is issued (see following drawing).

驱动器输入信号内部接口示意图

4.3 Off-line level signal EN

After the driver is energized, the step motor is at the lock-out state (when not applied with CP impulse) or the running state (when applied with CP impulse). But when the user wants to regulate manually the motor, and does not want to disconnect the driver power, how to solve this problem? This signal can be used at this time. When this signal is in active (low level active), the motor is at Free State without moment. When this signal is at high level or not connected, cancel the off-line state. This signal can be used by the user in option. If this function is not needed, this terminal shall not be connected.

5. Power description

WZM-240 driver requires a DC 24 - 40V power from outside. The current is based on the phase current of the motor. In general, the current shall be as same as the phase current of the motor. If the motor speed is low, the lower driving voltage is selected. If the motor speed is higher, the higher driving voltage is selected. We provide matched transformers and welcome ordering.

6. Description on indicators

There are two indicators on the driver: Power indicator (Green) and Not ready indicator (Red). After the driver is energized, the power indicator is on. If the protection action occurs on the driver, the not-ready indicator is on. (There are protective circuits of over current and over heating etc. inside the driver.).

8. Frequently asked questions

8.1 When the rotation direction of the step motor is opposite to the direction required by me, how can I adjust it?

Change the direction signal of the control system, or adjust the motor connection so as to change the rotation direction. The details are as follows:

For the motor with two-phase four wires, it is needed only to exchange one phase wire of the motor and then insert it into the driver. For instance: A+ and A- are exchanged each other.

8.2 If the motor is two-phase, four-phases, 6 wires and 8 wires, but the driver only needs 4 wires, how can I connect them?

Four-phase mixture motor is called also as two-phase mixture motor, with only difference that the outlet wires of four-phase motor have many connection methods. For two-phase 4 wires motor, the motor can be connected directly with the driver. For four-phase 6 wires motor, the tapped two wires are not used, other 4 wires are connected with the driver. For four-phase 8 wires motor, usually two coils are connected in parallel and then connected together with the driver.

8.3 How to calculate the pace angle of the motor after subdivide?

For two phases and four-phases motor, the pace angle after subdividing is equal to the complete pace angle of the motor divided by subdivide number. For instance, the step number per rotation is set as 400 steps, use 0.9 kWh /1.8 kWh motor, the subdivide pace angle is 360º/400=0.9º. If the step number per rotation is set as 6000 steps, use 0.9 kwh /1.8 kwh motor, the subdivide pace angle is 360º/6000=0.06º.

8.4 The noise of the motor is particularly high, the motor is weak and is vibrating?

If such thing occurs, the step motor works at the vibration region. In general, this problem can be solved by changing the input signal frequency CP.

8.5 The motor is normal at slow running, when the frequency is a little higher, the locked rotor phenomena occurs.

Under such a situation, it is usually that the supply voltage on the driver is not high enough. When the input voltage is adjusted to be larger, such problem can be solved. It shall be noticed that the voltage shall not be higher than the maximal voltage marked on the driver power end. Otherwise, the driver may be burnt. If the original supply voltage is AC 60V, the AC 110V power can be used.

8.6 After the driver is energized, the motor is vibrating and can not rotate.

If such thing occurs, first of all, check the connection between the motor winding and the driver for mistake. If the connection is correct, check the input frequency if it is too high. Refer to 8.7. The brief introduction of motor speed adjusting can solve this problem. If the problem can not be solved, the driver may be burnt. Please contact our company.
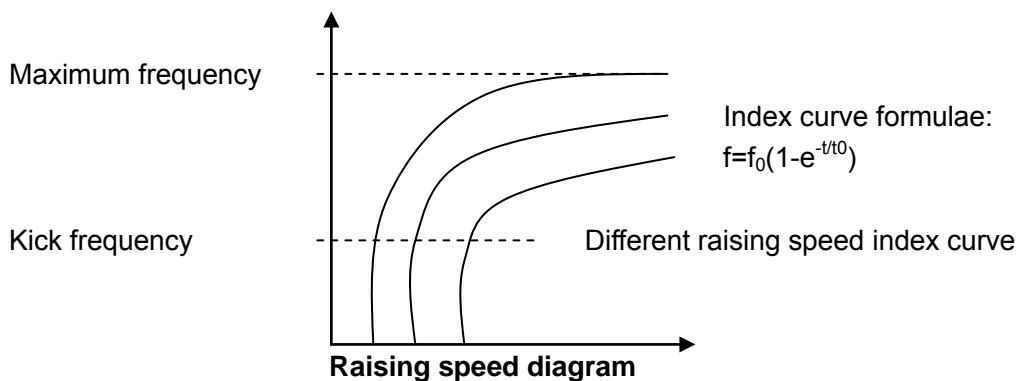
8.7 Brief introduction of speed adjusting:

The speed of the step motor is adjusted by changing the input impulse signal. In theory, it is needed

only to apply the impulse signal on the driver. When each impulse (CP) is applied on the driver, the step motor rotates one pace angle (One subdivide pace angle in subdivide). But in fact, if impulse CP signal changes too fast, due to the inertia, the step motor can not keep up with the signal change. The locked rotor and loss step phenomena may occur. As a result, when the step motor starts, the raising speed process must be needed. The speed reduction process must be needed when stopping. In general, the rule of raising speed and decelerating is same. It is introduced here with raising speed as the example:

The raising speed process is composed of kick frequency plus speed raising curve (Decelerating process in reverse). The kick frequency means the pulse starting frequency applied suddenly when the step motor is at stationary state. This frequency shall not be too large, otherwise, the locked rotor and loss step phenomena may occur also. The speed up and down curve is the index curve or the index curve adjusted in general. The straight curve or sine curve etc. may be adopted also. The user shall select suitable kick frequency and speed up and down curve according to the load. It is not easy to find an ideal curve. Several times of "test running" are needed in general. The index curve is comparatively complicated in actual software programming. In general, the time constant calculated in advance is stored in the computer storage and selected directly during operation.

The speed up and down design of the step motor is the major index of the control software. The design level will influence directly the operation stability of the motor, speed change velocity, motor operation noise, top speed, positioning accuracy (Under the condition that the product is used correctly, we can guarantee that the precision is100%). One special case is that: When the running speed of the step motor does not exceed the kick frequency, the speed up and down case will not exist.

Maximum frequency

Index curve formulae:
$$f=f_0(1-e^{-t/t0})$$

Kick frequency   Different raising speed index curve

Raising speed diagram

9. Marketing principle

With the principle of "Users in priority; credit first", we assist the user to solve the difficult problems occurred in use so that the users can use our products correctly. We are glad to discuss the application of our products on the system equipment in technical aspects with the users. The guarantee period of the product is one year. The product can be repaired on whole service life.

MANUAL &

INSTALLATION INSTRUCTIONS

for

MODEL WZM-2H057MK

TRANSLATOR

DRIVE

WZM-2H057MK two-phase Hybrid stepping motor subdivide driver

1. Summary

WZM-2H057MK driver is used to drive two-phase Hybrid stepping motor. The driver is equipped with the imported module to realize high frequency chopped wave. It is featured with constant current driving, very strong anti-interference performance, good high frequency performance, high starting frequency, optical isolation between the control signal and internal signal, current in optional, simple structure, stable operation, high reliability and less noise. It can drive all 42BYG, 57BYG series two-phase Hybrid stepping motors with currency less than 3A.

The driver enjoys great reputation in the customers since it is put into market. It is used widely in the industries of stage light, automation, instrument, POS machine, engraving machine, bill printer, industrial decal printer, semiconductor diffusion furnace etc.

Characteristics of WZM-2H057MK driver

1.1 The maximal current of each phase of the driver is 3A. The current is adjustable in 16 steps.

1.2 Adopting the over current resistance patented technology.

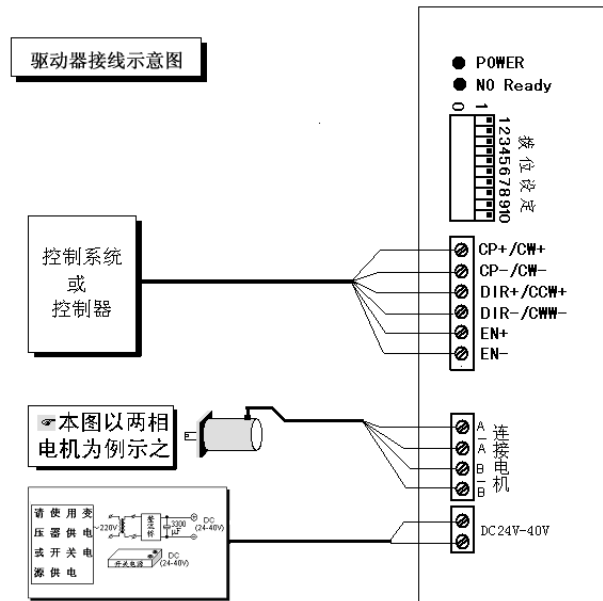1.3 Equipped with imported electric and electronic components.

1.4 Half current in optional.

　　The step number per revolution is in optional
(400,800,1600,3200,6400,12800,25600,51200,600,1200,1000,2000,4000,8000,16000,32000 adjustable in 16 steps)
　　&microsteps divide number2,4,8,16,32,64,128,256,3,6,5,10,20,40,80,160 adjustable in 16 steps
1.6 All input signals undergo optical isolation.

1.7 The motor phase current is sine wave.

Connection diagram of driver

驱动器接线示意图　Connection diagram of driver

控制系统或控制器　Control system or controller

本图以两相电机为例示之　Two phase motor as the example in this diagram

拨位设置　Step setting

连接电机　Connecting motor

Signal interface:

CP+   positive terminal of step impulse signal

CP-   Negative terminal of step impulse signal

DIR+ Positive terminal of direction level signal

DIR- Negative terminal of direction level signal

EN+   Positive terminal of enable level signal

EN-   Negative terminal of enable level signal

CW+ Positive terminal of positive direction step impulse signal

CW- Negative terminal of positive direction step impulse signal

CCW+ Positive terminal of reverse direction step impulse signal

CCW- Negative terminal of reverse step impulse signal

Indicator :	**Power**	Power indicator (Green light)
	No ready	Not ready indicator (Red light)
Setting step switch:	**1-4**th steps	Setting step number of each revolution of the motor (Subdivide number)
	5th step	Setting step impulse signal mode. 0-Monopulse. 1-Double pulse
	6th Step	Setting half current allowed or not. 0-Not allowed. 1-Allowed
	7-10th steps	Setting output current
Motor interface:	$A 、 \bar{A} 、 B 、 \bar{B}$	
Power interface:	**DC24V-40V** AC supply not less than **60W**. **50~60Hz** shall not be connected directly into the circuit. The voltage shall be reduced by transformer.	

2. Technical specifications

2.1 Power supply: **DC24V-40V**.

2.2 Driver motor: **42BYG series and 57BYG series.**

2.3 Drive current: In accordance with different motors, the driver shall be adjusted so that the output current is matched with the rated current of the motor. If the motor can drive the load, the output current of the driver can be adjusted to be less than the rated current of the motor, but not be larger than the rated current of the motor. **Otherwise, the motor may be overheated.**

2.4 Driving method: Sine wave constant current chopped wave driving.

3. Subdivide number and phase current setting:

The subdivide number and phase current are set by the step switches on the driver according to the instruction on the front panel. Under the allowable control frequency, make every effort to select high subdivide number, in this way; the motor operation will be more stable. Refer to the following table for the specific setting method:

Step number setting		
1 2 3 4 steps	subdivide number	Pace angle
0000	2	0.9°
0001	4	0.45°
0010	8	0.225°
0011	16	0.1125°
0100	32	0.05625°
0101	64	0.028125°
0110	128	0.0140625°
0111	256	0.00703125°
1000	3	0.6°
1001	6	0.3°
1010	5	0.36°
1011	10	0.18°
1100	20	0.09°
1101	40	0.045°
1110	80	0.0225°
1111	160	0.01125°

0 – ON, 1 – OFF for step resolution

Current setting (Set at off position)	
7th step	1.6A
8th step	0.8A
9th step	0.4A
10th step	0.2A
The current is maximal 3A when all 7 - 10 steps are at OFF position.	

1 – to select current setting

4. Control signal input connection

In order that the control system and the driver can communicate normally, avoiding the interference each other, we isolate the input signal with the optical coupling device inside the driver. The internal interface circuits of three signals are same. The common mode is 1) Common anode mode: Connect **CP+**. **DIR+ and EN+** terminals together as the common anode terminal, which is then connected to the external system **+5V**. The impulse signal is connected to **CP-** terminal. The direction signal is connected to DIR- terminal. The enable signal is connected to **EN- terminal**. 2) Common cathode mode: Connect **CP-**. **DIR- and EN-** terminals together as the common cathode terminal, which is then connected to the external system **GND**. The impulse signal is connected to **CP+** terminal. The direction signal is connected to **DIR+** terminal. The enable signal is connected to **EN+** terminal. 3) Differential mode: Direct connection
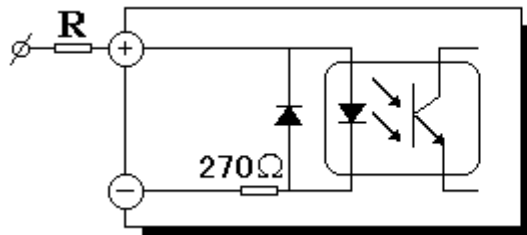

驱动器输入信号内部接口示意图

驱动器内部 Driver internal

驱动器输入信号内部接口示意图 Internal interface diagram of the driver input signals

If the voltage of the input signal exceeds +5V, the current limiting resistance R must be added in the external circuit to ensure providing 8 - 15mA drive current to the optical coupler inside the driver. See following diagram and table.

信号幅值	外接限流电阻R
5V	不加
12V	680Ω
24V	2.0KΩ

信号幅值 voltage of signal

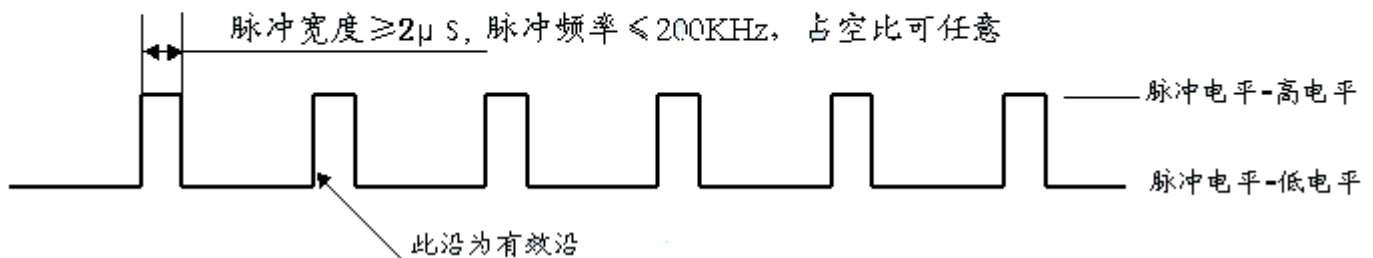外接限流电阻 R External current limiting resistance R

不加 not added

4.1 Step impulse signal CP

The step impulse signal CP is used to control the position and speed of the step motor. Which is to say: Once the driver receives one CP impulse, the step motor will be driven by the driver for a pace angle (One subdivide pace angle in subdivide). The frequency change of the impulse **CP** changes the rotation speed of the step motor at the same time. The step motor could be positioned precisely by controlling the number of CP impulses. In this way, it is very convenient to realize the speed regulation and positioning of the step motor. The CP signal of the driver is low level active. The drive current required by CP signal is **8-15mA**. There is certain requirement on CP pulse width, not less than **2μS** in general (See following drawing).

脉冲信号的频率要求不大于200KHz；
脉冲信号的宽度要求不小于2μS。
脉冲信号的驱动电流要求为8-15mA

脉冲信号的频率要求不大于 200KHz. The frequency of the impulse signal shall not be larger than 200KHz.

脉冲信号的宽度要求不小于 2μS. The width of the impulse signal shall not be less than 2μS.

脉冲信号的驱动电流要求为 8-15mA. The drive current of the impulse signal shall be 8-15mA.

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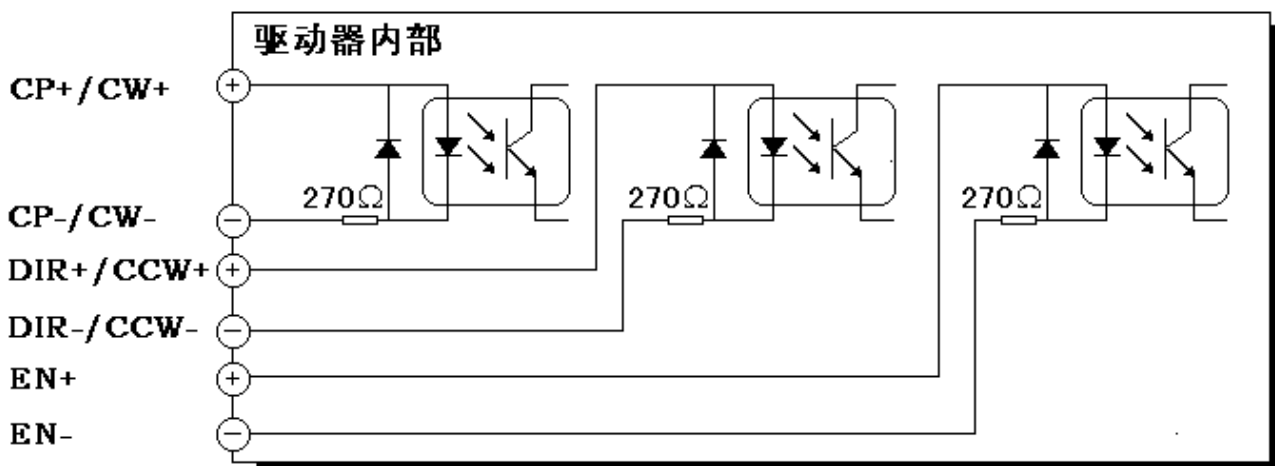
此沿为有效沿　This edge is valid edge.

脉冲电平-高电平　　Impulse level-High level

脉冲电平-低电平　　Impulse level-Lower level

4.2 Direction level signal DIR

The direction level signal DIR is used for controlling the rotation direction of the step motor. When this terminal is at high level, the motor rotates in one direction. When this terminal is at low level, the motor rotates in another direction. We call this commutation mode as single pulse mode. In addition, there is two pulse commutation mode: The driver receives the impulse signal from two circuits (Marked as **CW** and **CCW**). When one circuit (such as CW) has impulse signal, the motor rotates in positive rotation. When another circuit (such as CCW) has impulse signal, the motor rotates in reversal direction. The 5th step switch decides which state is used. The rotation direction of the motor can be changed only after the motor stops. The commutation signal must be issued after the last CP impulse in previous direction is finished and before the first CP impulse in another direction is issued (see following drawing).

驱动器内部

CP+/CW+

CP-/CW-
DIR+/CCW+
DIR-/CCW-
EN+
EN-

270Ω　　　270Ω　　　270Ω

驱动器输入信号内部接口示意图

4.3 Off-line level signal EN

After the driver is energized, the step motor is at the lock-out state (when not applied with CP impulse) or the running state (when applied with CP impulse). But when the user wants to regulate manually the motor, and does not want to disconnect the driver power, how to solve this problem? This signal can be used at this time. When this signal is in active (low level active), the motor is at Free State without moment. When this signal is at high level or not connected, cancel the off-line state. This signal can be used by the user in option. If this function is not needed, this terminal shall not be connected.
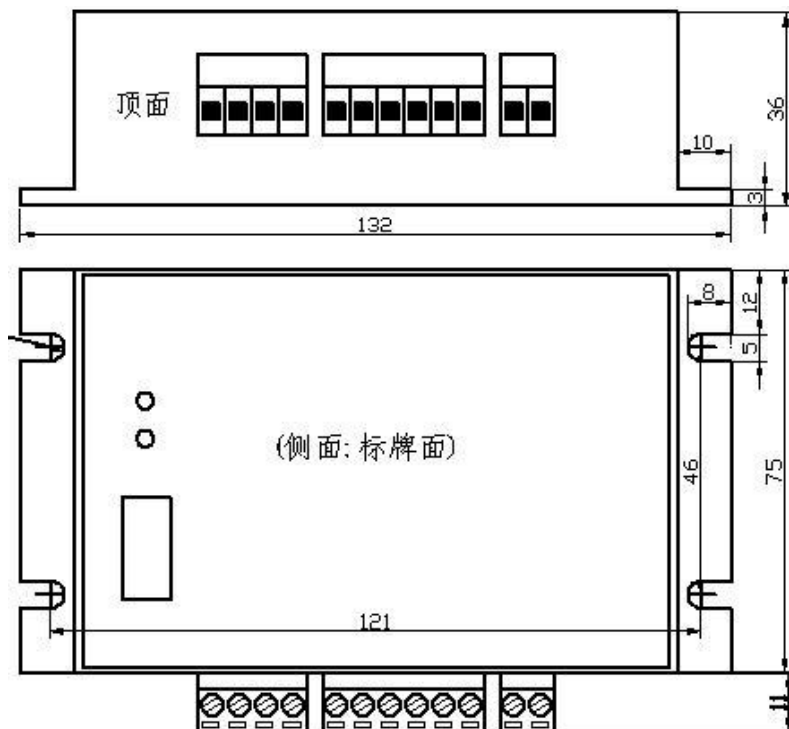
5. Power description

WZM-2H057MK driver requires a DC 24 - 40V power from outside. The current is based on the phase current of the motor. In general, the current shall be as same as the phase current of the motor. If the motor speed is low, the lower driving voltage is selected. If the motor speed is higher, the higher driving voltage is selected. We provide matched transformers and welcome ordering.

6. Description on indicators

There are two indicators on the driver: Power indicator (Green) and Not ready indicator (Red). After the driver is energized, the power indicator is on. If the protection action occurs on the driver, the not-ready indicator is on. (There are protective circuits of over current and over heating etc. inside the driver.).

7. External dimensions: Please refer to following drawing.

顶面: 标牌面 top face: label
侧面 side face

8. Frequently asked questions

8.1 When the rotation direction of the step motor is opposite to the direction required by me, how can I adjust it?
Change the direction signal of the control system, or adjust the motor connection so as to change the rotation direction. The details are as follows:
For the motor with two-phase four wires, it is needed only to exchange one phase wire of the motor and then insert it into the driver. For instance: A+ and A- are exchanged each other.

8.2 If the motor is two-phase, four-phases, 6 wires and 8 wires, but the driver only needs 4 wires, how can I connect them？

Four-phase mixture motor is called also as two-phase mixture motor, with only difference that the outlet wires of four-phase motor have many connection methods. For two-phase 4 wires motor, the motor can be connected directly with the driver. For four-phase 6 wires motor, the tapped two wires are not used, other 4 wires are connected with the driver. For four-phase 8 wires motor, usually two coils are connected in parallel and then connected together with the driver.

8.3 How to calculate the pace angle of the motor after subdivide?

For two phases and four-phases motor, the pace angle after subdividing is equal to the complete pace angle of the motor divided by subdivide number. For instance, the step number per rotation is set as 400 steps, use 0.9 kWh /1.8 kWh motor, the subdivide pace angle is 360º/400=0.9º. If the step number per rotation is set as 6000 steps, use 0.9 kwh /1.8 kwh motor, the subdivide pace angle is 360º/6000=0.06º.

8.4 The noise of the motor is particularly high, the motor is weak and is vibrating？

If such thing occurs, the step motor works at the vibration region. In general, this problem can be solved by changing the input signal frequency CP.

8.5 The motor is normal at slow running, when the frequency is a little higher, the locked rotor phenomena occurs.

Under such a situation, it is usually that the supply voltage on the driver is not high enough. When the input voltage is adjusted to be larger, such problem can be solved. It shall be noticed that the voltage shall not be higher than the maximal voltage marked on the driver power end. Otherwise, the driver may be burnt. If the original supply voltage is AC 60V, the AC 110V power can be used.

8.6 After the driver is energized, the motor is vibrating and can not rotate.

If such thing occurs, first of all, check the connection between the motor winding and the driver for mistake. If the connection is correct, check the input frequency if it is too high. Refer to 8.7. The brief introduction of motor speed adjusting can solve this problem. If the problem can not be solved, the driver may be burnt. Please contact our company.
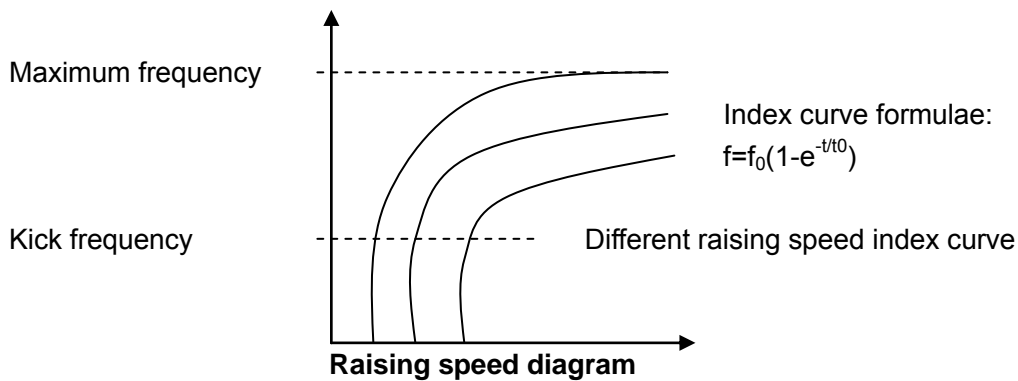
8.7 Brief introduction of speed adjusting:

The speed of the step motor is adjusted by changing the input impulse signal. In theory, it is needed only to apply the impulse signal on the driver. When each impulse (CP) is applied on the driver, the step motor rotates one pace angle (One subdivide pace angle in subdivide). But in fact, if impulse CP signal changes too fast, due to the inertia, the step motor can not keep up with the signal change. The locked rotor and loss step phenomena may occur. As a result, when the step motor starts, the raising speed process must be needed. The speed reduction process must be needed when stopping. In general, the rule of raising speed and decelerating is same. It is introduced here with raising speed as the example:

The raising speed process is composed of kick frequency plus speed raising curve (Decelerating

process in reverse). The kick frequency means the pulse starting frequency applied suddenly when the step motor is at stationary state. This frequency shall not be too large, otherwise, the locked rotor and loss step phenomena may occur also. The speed up and down curve is the index curve or the index curve adjusted in general. The straight curve or sine curve etc. may be adopted also. The user shall select suitable kick frequency and speed up and down curve according to the load. It is not easy to find an ideal curve. Several times of "test running" are needed in general. The index curve is comparatively complicated in actual software programming. In general, the time constant calculated in advance is stored in the computer storage and selected directly during operation.

The speed up and down design of the step motor is the major index of the control software. The design level will influence directly the operation stability of the motor, speed change velocity, motor operation noise, top speed, positioning accuracy (Under the condition that the product is used correctly, we can guarantee that the precision is100%). One special case is that: When the running speed of the step motor does not exceed the kick frequency, the speed up and down case will not exist.

Maximum frequency

Index curve formulae:
$f=f_0(1-e^{-t/t0})$

Kick frequency

Different raising speed index curve

Raising speed diagram

9. Marketing principle

With the principle of "Users in priority; credit first", we assist the user to solve the difficult problems occurred in use so that the users can use our products correctly. We are glad to discuss the application of our products on the system equipment in technical aspects with the users. The guarantee period of the product is one year. The product can be repaired on whole service life.

MANUAL &

INSTALLATION INSTRUCTIONS

for

MODEL WZM-2H090MK

TRANSLATOR

DRIVE

WZM-2H090MK two-phase Hybrid stepping motor subdivide driver

1. Summary

WZM-2H090MK driver is used to drive two-phase Hybrid stepping motor. The driver is equipped with the imported module to realize high frequency chopped wave. It is featured with constant current driving, very strong anti-interference performance, good high frequency performance, high starting frequency, optical isolation between the control signal and internal signal, current in optional, simple structure, stable operation, high reliability and less noise. It can drive all 110BYG series two-phase Hybrid stepping motors with currency less than 5A.

The driver enjoys great reputation in the customers since it is put into market. It is used widely in the industries of stage light, automation, instrument, POS machine, engraving machine, bill printer, industrial decal printer, semiconductor diffusion furnace etc.

Characteristics of WZM-2H090MK driver

1.1 The maximal current of each phase of the driver is 5A. The current is adjustable in 16 steps.

1.2 Adopting the over current resistance patented technology.

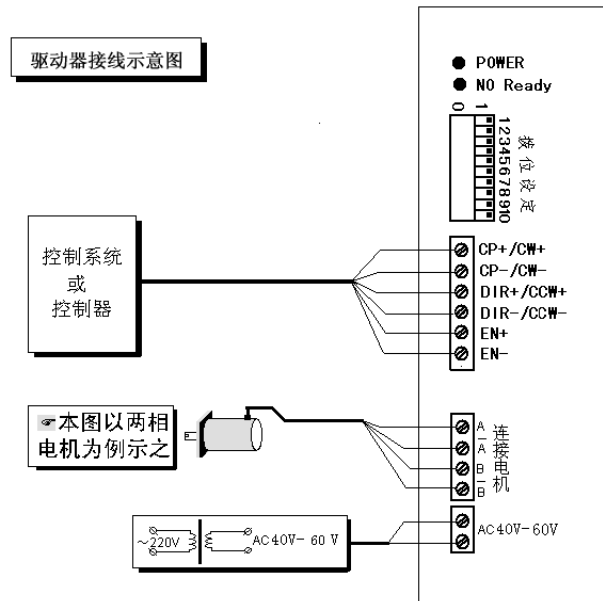1.3 Equipped with imported electric and electronic components.

1.4 Half current in optional.

   The step number per revolution is in optional (400,800,1600,3200,6400,12800,25600,51200,600,1200,1000,2000,4000,8000,16000,32000 adjustable in 16 steps)
   &microsteps divide number2,4,8,16,32,64,128,256,3,6,5,10,20,40,80,160 adjustable in 16 steps
1.6 All input signals undergo optical isolation.

1.7 The motor phase current is sine wave.

驱动器接线示意图

● POWER
● NO Ready

1 2 3 4 5 6 7 8 9 10　拨位设定

CP+/CW+
CP-/CW-
DIR+/CCW+
DIR-/CCW-
EN+
EN-

控制系统
或
控制器

☞本图以两相
电机为例示之

A
A
B
B　连接电机

~220V　AC40V- 60 V

AC40V-60V

Connection diagram of driver

驱动器接线示意图　Connection diagram of driver
控制系统或控制器　Control system or controller
本图以两相电机为例示之　Two phase motor as the example in this diagram
拨位设置　Step setting
连接电机　Connecting motor

Signal interface:

CP+ positive terminal of step impulse signal

CP- Negative terminal of step impulse signal

DIR+ Positive terminal of direction level signal

DIR- Negative terminal of direction level signal

EN+ Positive terminal of enable level signal

EN- Negative terminal of enable level signal

CW+ Positive terminal of positive direction step impulse signal

CW- Negative terminal of positive direction step impulse signal

CCW+ Positive terminal of reverse direction step impulse signal

CCW- Negative terminal of reverse step impulse signal

Indicator :	**Power**	Power indicator (Green light)
	No ready	Not ready indicator (Red light)
Setting step switch:	**1-4**th steps	Setting step number of each revolution of the motor (Subdivide number)
	5th step	Setting step impulse signal mode. 0-Monopulse. 1-Double pulse
	6th Step	Setting half current allowed or not. 0-Not allowed. 1-Allowed
	7-10th steps	Setting output current
Motor interface:	$A、\overline{A}、B、\overline{B}$	
Power interface:	**AC40V-60V**	AC supply not less than **200W**. **50~60Hz** shall not be connected directly into the circuit. The voltage shall be reduced by transformer.

2. Technical specifications

2.1 Power supply: **AC 40V-60V**.

2.2 Driver motor: **85BYGH250 series, 86BYG250 series and 90BYG250 series.**

2.3 Drive current: In accordance with different motors, the driver shall be adjusted so that the output current is matched with the rated current of the motor. If the motor can drive the load, the output current of the driver can be adjusted to be less than the rated current of the motor, but not be larger than the rated current of the motor. **Otherwise, the motor may be overheated.**

2.4 Driving method: Sine wave constant current chopped wave driving.

3. Subdivide number and phase current setting:

The subdivide number and phase current are set by the step switches on the driver according to the instruction on the front panel. Under the allowable control frequency, make every effort to select high subdivide number, in this way, the motor operation will be more stable. Refer to the following table for the specific setting method:

Step number setting		
1 2 3 4 steps	subdivide number	Pace angle
0000	2	0.9^{o}
0001	4	0.45^{o}
0010	8	0.225^{o}
0011	16	0.1125^{o}
0100	32	0.05625^{o}
0101	64	0.028125^{o}
0110	128	0.0140625^{o}
0111	256	0.00703125^{o}
1000	3	0.6^{o}
1001	6	0.3^{o}
1010	5	0.36^{o}
1011	10	0.18^{o}
1100	20	0.09^{o}
1101	40	0.045^{o}
1110	80	0.0225^{o}
1111	160	0.01125^{o}

0 – ON, 1 – OFF for current setting

Current setting (Set at off position)	
7th step	2.6A
8th step	1.3A
9th step	0.7A
10th step	0.4A
The current is maximal 5A when all 7 - 10 steps are at OFF position.	

1 – to select current setting

4. Control signal input connection

In order that the control system and the driver can communicate normally, avoiding the interference each other, we isolate the input signal with the optical coupling device inside the driver. The internal interface circuits of three signals are same. The common mode is 1) Common anode mode: Connect **CP+**. **DIR+ and EN+** terminals together as the common anode terminal, which is then connected to the external system **+5V**. The impulse signal is connected to **CP-** terminal. The direction signal is connected to DIR- terminal. The enable signal is connected to **EN- terminal**. 2) Common cathode mode: Connect **CP-**. **DIR- and EN-** terminals together as the common cathode terminal, which is then connected to the external system **GND**. The impulse signal is connected to **CP+** terminal. The direction signal is connected to **DIR+** terminal. The enable signal is connected to **EN+** terminal. 3) Differential mode: Direct connection
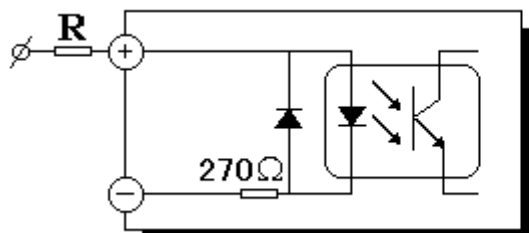

驱动器输入信号内部接口示意图

驱动器内部 Driver internal
驱动器输入信号内部接口示意图 Internal interface diagram of the driver input signals

If the voltage of the input signal exceeds +5V, the current limiting resistance R must be added in the external circuit to ensure providing 8 - 15mA drive current to the optical coupler inside the driver. See following diagram and table.

信号幅值	外接限流电阻R
5V	不加
12V	680Ω
24V	2.0KΩ

信号幅值 voltage of signal
外接限流电阻 R External current limiting resistance R
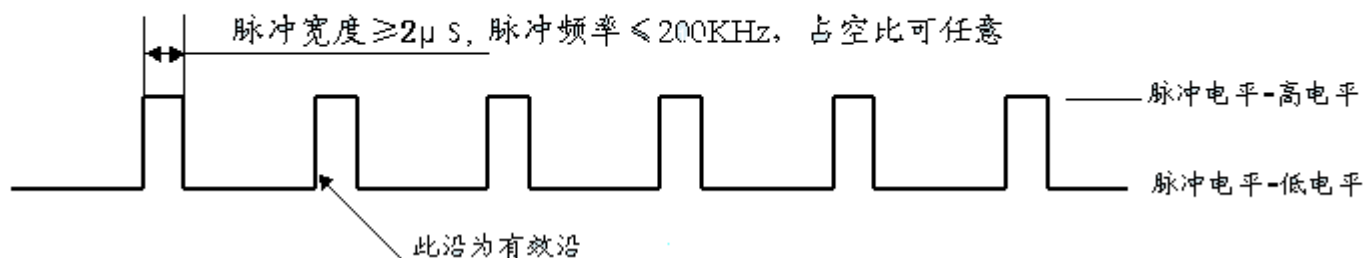不加 not added

4.1 Step impulse signal CP

The step impulse signal CP is used to control the position and speed of the step motor. Which is to say: Once the driver receives one CP impulse, the step motor will be driven by the driver for a pace angle (One subdivide pace angle in subdivide). The frequency change of the impulse **CP** changes the rotation speed of the step motor at the same time. The step motor could be positioned precisely by controlling the number of CP impulses. In this way, it is very convenient to realize the speed regulation and positioning of the step motor. The CP signal of the driver is low level active. The drive current required by CP signal is **8-15mA**. There is certain requirement on CP pulse width, not less than **2μS** in general (See following drawing).

脉冲信号的频率要求不大于200KHz；
脉冲信号的宽度要求不小于2μS。
脉冲信号的驱动电流要求为8-15mA

脉冲宽度≥2μS，脉冲频率≤200KHz，占空比可任意
脉冲电平-高电平
脉冲电平-低电平
此沿为有效沿

脉冲信号的频率要求不大于 200KHz. The frequency of the impulse signal shall not be larger than 200KHz.
脉冲信号的宽度要求不小于 2μS. The width of the impulse signal shall not be less than 2μS.

脉冲信号的驱动电流要求为 8-15mA.　The drive current of the impulse signal shall be 8-15mA.
脉冲宽度≥200KHz, 脉冲频率≤2μS, 占空比可任意. Pulse frequency ≥200KHz; Pulse width ≤2μS; Pulse duty factor is at discretion.
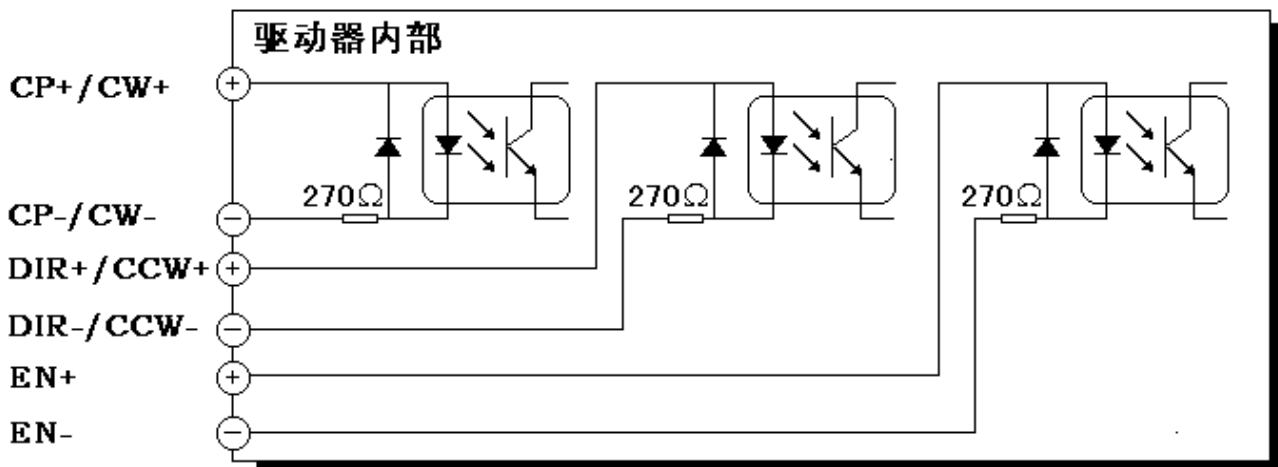此沿为有效沿　This edge is valid edge.
脉冲电平-高电平　　Impulse level-High level
脉冲电平-低电平　　Impulse level-Lower level

4.2 Direction level signal DIR

The direction level signal DIR is used for controlling the rotation direction of the step motor. When this terminal is at high level, the motor rotates in one direction. When this terminal is at low level, the motor rotates in another direction. We call this commutation mode as single pulse mode. In addition, there is two pulse commutation mode: The driver receives the impulse signal from two circuits (Marked as **CW** and **CCW**). When one circuit (such as CW) has impulse signal, the motor rotates in positive rotation. When another circuit (such as CCW) has impulse signal, the motor rotates in reversal direction. The 5th step switch decides which state is used. The rotation direction of the motor can be changed only after the motor stops. The commutation signal must be issued after the last CP impulse in previous direction is finished and before the first CP impulse in another direction is issued (see following drawing).

驱动器输入信号内部接口示意图

4.3 Off-line level signal EN

After the driver is energized, the step motor is at the lock-out state (when not applied with CP impulse) or the running state (when applied with CP impulse). But when the user wants to regulate manually the motor, and does not want to disconnect the driver power, how to solve this problem? This signal can be used at this time. When this signal is in active (low level active), the motor is at free state without moment. When this signal is at high level or not connected, cancel the off-line state. This signal can be used by the user in option. If this function is not needed, this terminal shall not be
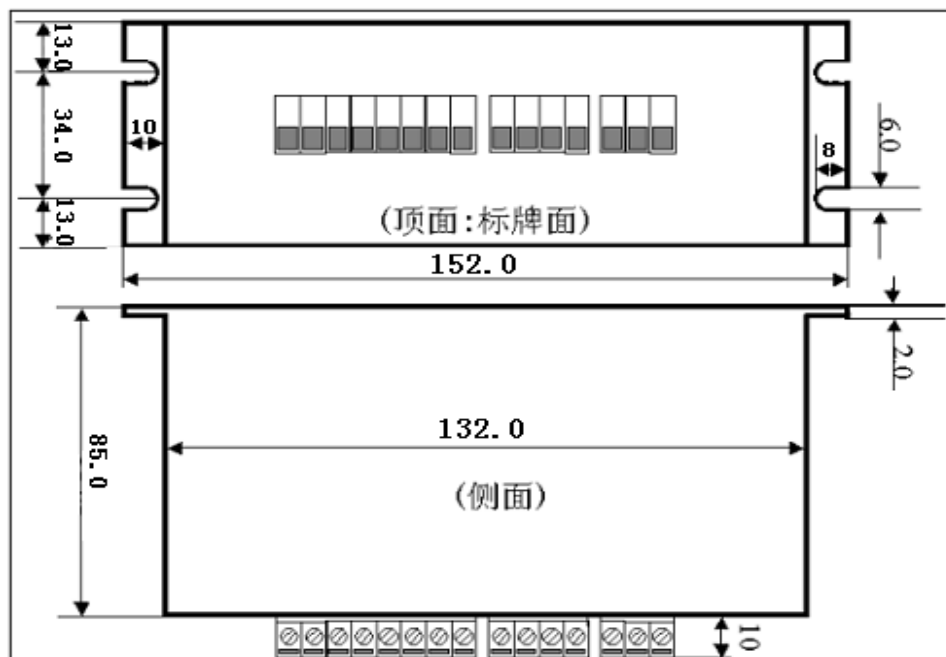
connected.

5. Power description

WZM-2H090MS driver requires a AC 40 - 60V power from outside. The current is based on the phase current of the motor. In general, the current shall be as same as the phase current of the motor. If the motor speed is low, the lower driving voltage is selected. If the motor speed is higher, the higher driving voltage is selected. We provide matched transformers and welcome ordering.

6. Description on indicators

There are two indicators on the driver: Power indicator (Green) and Not ready indicator (Red). After the driver is energized, the power indicator is on. If the protection action occurs on the driver, the not-ready indicator is on. (There are protective circuits of over current and over heating etc. inside the driver.).

7. External dimensions: Please refer to following drawing.

顶面: 标牌面   top face: label
侧面 side face

8. Frequently asked questions

8.1 When the rotation direction of the step motor is opposite to the direction required by me, how can I adjust it?

Change the direction signal of the control system, or adjust the motor connection so as to change the rotation direction. The details are as follows:

For the motor with two-phase four wires, it is needed only to exchange one phase wire of the motor and then insert it into the driver. For instance: A+ and A- are exchanged each other.

8.2 If the motor is two-phase, four-phases, 6 wires and 8 wires, but the driver only needs 4 wires, how can I connect them？

Four-phase mixture motor is called also as two-phase mixture motor, with only difference that the outlet wires of four-phase motor have many connection methods. For two-phase 4 wires motor, the motor can be connected directly with the driver. For four-phase 6 wires motor, the tapped two wires are not used, other 4 wires are connected with the driver. For four-phase 8 wires motor, usually two coils are connected in parallel and then connected together with the driver.

8.3 How to calculate the pace angle of the motor after subdivide?

For two phases and four-phases motor, the pace angle after subdividing is equal to the complete pace angle of the motor divided by subdivide number. For instance, the step number per rotation is set as 400 steps, use 0.9 kWh /1.8 kWh motor, the subdivide pace angle is 360º/400=0.9º. If the step number per rotation is set as 6000 steps, use 0.9 kwh /1.8 kwh motor, the subdivide pace angle is 360º/6000=0.06º.

8.4 The noise of the motor is particularly high, the motor is weak and is vibrating？

If such thing occurs, the step motor works at the vibration region. In general, this problem can be solved by changing the input signal frequency CP.

8.5 The motor is normal at slow running, when the frequency is a little higher, the locked rotor phenomena occurs.

Under such a situation, it is usually that the supply voltage on the driver is not high enough. When the input voltage is adjusted to be larger, such problem can be solved. It shall be noticed that the voltage shall not be higher than the maximal voltage marked on the driver power end. Otherwise, the driver may be burnt. If the original supply voltage is AC 60V, the AC 110V power can be used.

8.6 After the driver is energized, the motor is vibrating and can not rotate.

If such thing occurs, first of all, check the connection between the motor winding and the driver for mistake. If the connection is correct, check the input frequency if it is too high. Refer to 8.7. The brief introduction of motor speed adjusting can solve this problem. If the problem can not be solved, the driver may be burnt. Please contact our company.
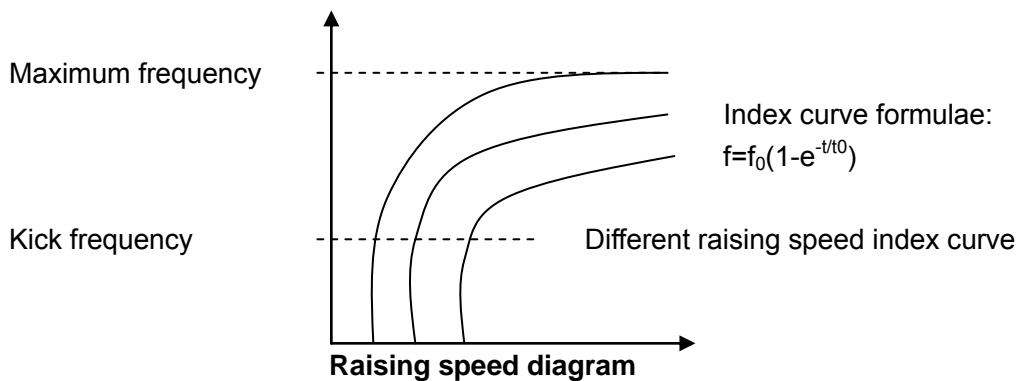
8.7 Brief introduction of speed adjusting:

The speed of the step motor is adjusted by changing the input impulse signal. In theory, it is needed only to apply the impulse signal on the driver. When each impulse (CP) is applied on the driver, the step motor rotates one pace angle (One subdivide pace angle in subdivide). But in fact, if impulse CP signal changes too fast, due to the inertia, the step motor can not keep up with the signal change. The locked rotor and loss step phenomena may occur. As a result, when the step motor starts, the raising speed process must be needed. The speed reduction process must be needed when stopping. In

general, the rule of raising speed and decelerating is same. It is introduced here with raising speed as the example:

The raising speed process is composed of kick frequency plus speed raising curve (Decelerating process in reverse). The kick frequency means the pulse starting frequency applied suddenly when the step motor is at stationary state. This frequency shall not be too large, otherwise, the locked rotor and loss step phenomena may occur also. The speed up and down curve is the index curve or the index curve adjusted in general. The straight curve or sine curve etc. may be adopted also. The user shall select suitable kick frequency and speed up and down curve according to the load. It is not easy to find an ideal curve. Several times of "test running" are needed in general. The index curve is comparatively complicated in actual software programming. In general, the time constant calculated in advance is stored in the computer storage and selected directly during operation.

The speed up and down design of the step motor is the major index of the control software. The design level will influence directly the operation stability of the motor, speed change velocity, motor operation noise, top speed, positioning accuracy (Under the condition that the product is used correctly, we can guarantee that the precision is100%). One special case is that: When the running speed of the step motor does not exceed the kick frequency, the speed up and down case will not exist.

Maximum frequency

Index curve formulae:
$f=f_0(1-e^{-t/t0})$

Kick frequency   Different raising speed index curve

Raising speed diagram

MANUAL &

INSTALLATION INSTRUCTIONS

for

MODEL WZM-2H130MK

TRANSLATOR

DRIVE

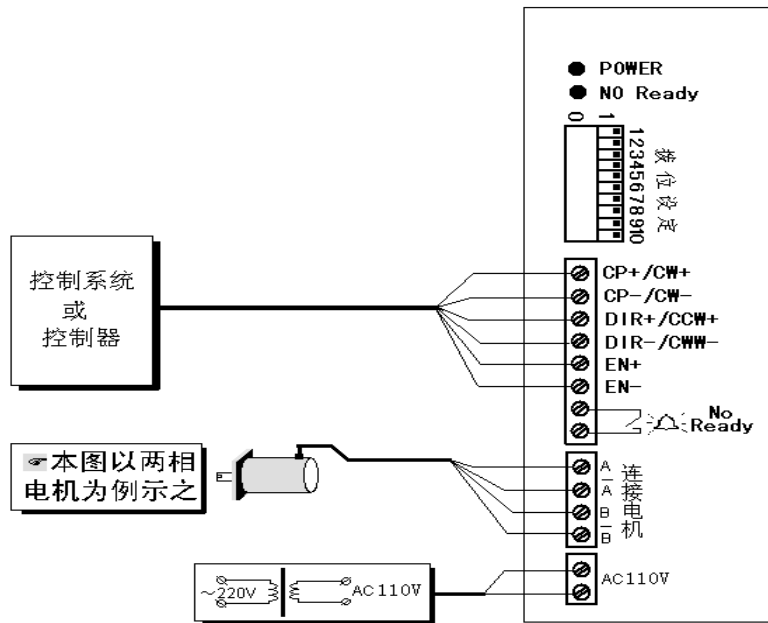# WZM-2H130MK two-phase hybrid stepping motor subdivide driver

1. Summary

WZM-2H130MK driver is used to drive two-phase hybrid step motor. The driver is equipped with the imported module to realize high frequency chopped wave. It is featured with constant current driving, very strong anti-interference performance, good high frequency performance, high starting frequency, optical isolation between the control signal and internal signal, current in optional, simple structure, stable operation, high reliability and less noise. It can drive all 130BYG series two-phase hybrid stepping motors with currency less than 7.5Amps.

The driver enjoys great reputation in the customers since it is put into market. It is used widely in the industries of stage light, automation, instrument, POS machine, engraving machine, bill printer, industrial decal printer, semiconductor diffusion furnace etc.

Characteristics of WZM-2H130MK driver

1.1 The maximal current of each phase of the driver is 7.5Amps. The current is adjustable in 16 steps.

1.2 Adopting the over current resistance patented technology.

1.3 Equipped with imported electric and electronic components.

1.4 Half current in optional.

1.5 The step number per revolution is in optional (400, 800, 1600, 3200, 6400,12800,25600,51200,600,1200,1000,2000,4000,8000,16000,32000 adjustable in 16 steps).
   &microsteps divide number2,4,8,16,32,64,128,256,3,6,5,10,20,40,80,160 adjustable in 16 steps
1.6 All input signals undergo optical isolation.

1.7 The motor phase current is sine wave.

Connection diagram of driver

驱动器接线示意图　Connection diagram of driver

控制系统或控制器　Control system or controller

本图以两相电机为例示之　Two phase motor as the example in this diagram

拨位设置　Step setting

连接电机　Connecting motor

Signal interface:

CP+　positive terminal of step impulse signal

CP-　Negative terminal of step impulse signal

DIR+　Positive terminal of direction level signal

DIR-　Negative terminal of direction level signal

EN+　Positive terminal of enable level signal

EN-　Negative terminal of enable level signal

CW+　Positive terminal of positive direction step impulse signal

CW-　Negative terminal of positive direction step impulse signal

CCW+Positive terminal of reverse direction step impulse signal

CCW- Negative terminal of reverse step impulse signal

Indicator :	**Power**	Power indicator (Green light)
	No ready	Not ready indicator (Red light)
Setting step switch:	**1-4**th steps	Setting step number of each revolution of the motor (Subdivide number)
	5th step	Setting step impulse signal mode. 0-Monopulse. 1-Double pulse
	6th Step	Setting half current allowed or not. 0-Not allowed. 1-Allowed
	7-10th steps	Setting output current
Motor interface:	$A、\overline{A}、B、\overline{B}$	
Power interface:	**AC110V** AC supply not less than**400W**. **50～60Hz** shall not be connected directly into the circuit. The voltage shall be reduced by transformer.	

2. Technical specifications

2.1 Power supply: **AC 110V**.

2.2 Driver motor: **130BYG250 series**

2.3 Drive current: In accordance with different motors, the driver shall be adjusted so that the output current is matched with the rated current of the motor. If the motor can drive the load, the output current of the driver can be adjusted to be less than the rated current of the motor, but not be larger than the rated current of the motor. **Otherwise, the motor may be overheated.**

2.4 Driving method: Sine wave constant current chopped wave driving.

3. Subdivide number and phase current setting:

The subdivide number and phase current are set by the step switches on the driver according to the instruction on the front panel. Under the allowable control frequency, make every effort to select high subdivide number, in this way, the motor operation will be more stable. Refer to the following table for the specific setting method:

Step number setting		
1 2 3 4 steps	subdivide number	Pace angle
0 0 0 0	2	0.9^o
0 0 0 1	4	0.45^o
0 0 1 0	8	0.225^o
0 0 1 1	16	0.1125^o
0 1 0 0	32	0.05625^o
0 1 0 1	64	0.028125^o
0 1 1 0	128	0.0140625^o
0 1 1 1	256	0.00703125^o
1 0 0 0	3	0.6^o
1 0 0 1	6	0.3^o
1 0 1 0	5	0.36^o
1 0 1 1	10	0.18^o
1 1 0 0	20	0.09^o
1 1 0 1	40	0.045^o
1 1 1 0	80	0.0225^o
1 1 1 1	160	0.01125^o

0 – ON, 1 – OFF for current setting

Current setting (Set at off position)	
7th step	4.0A
8th step	2.0A
9th step	1.0A
10th step	0.5A
The current is maximal 7.5A when all 7 - 10 steps are at OFF position.	

1 – to select current setting

4. Control signal input connection

In order that the control system and the driver can communicate normally, avoiding the interference each other, we isolate the input signal with the optical coupling device inside the driver. The internal interface circuits of three signals are same. The common mode is 1) Common anode mode: Connect **CP+**. **DIR+ and EN+** terminals together as the common anode terminal, which is then connected to the external system **+5V**. The impulse signal is connected to **CP-** terminal. The direction signal is connected to DIR**-** terminal. The enable signal is connected to **EN- terminal**. 2) Common cathode mode: Connect **CP-**. **DIR- and EN-** terminals together as the common cathode terminal, which is then connected to the external system **GND**. The impulse signal is connected to **CP+** terminal. The direction signal is connected to **DIR+** terminal. The enable signal is connected to **EN+** terminal. 3) Differential mode: Direct connection.
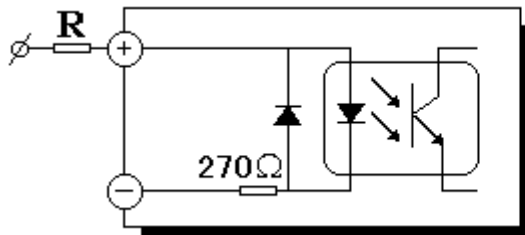

驱动器输入信号内部接口示意图

驱动器内部 Driver internal

驱动器输入信号内部接口示意图 Internal interface diagram of the driver input signals

If the voltage of the input signal exceeds +5V, the current limiting resistance R must be added in the external circuit to ensure providing 8 - 15mA drive current to the optical coupler inside the driver. See following diagram and table.

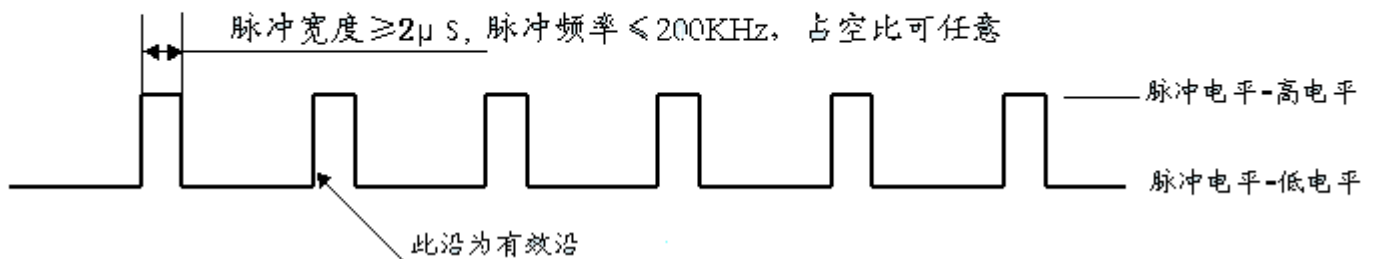| 信号幅值	外接限流电阻R
5V	不加
12V	680Ω
24V	2.0KΩ

号幅值 voltage of signal

外接限流电阻 R External current limiting resistance R

不加 not added

4.1 Step impulse signal CP

The step impulse signal CP is used to control the position and speed of the step motor. Which is to say: Once the driver receives one CP impulse, the step motor will be driven by the driver for a pace angle (One subdivide pace angle in subdivide). The frequency change of the impulse **CP** changes the rotation speed of the step motor at the same time. The step motor could be positioned precisely by controlling the number of CP impulses. In this way, it is very convenient to realize the speed regulation and positioning of the step motor. The CP signal of the driver is low level active. The drive current required by CP signal is **8-15mA**. There is certain requirement on CP pulse width, not less than **2μS** in general (See following drawing).

脉冲信号的频率要求不大于200KHz；
脉冲信号的宽度要求不小于2μS。
脉冲信号的驱动电流要求为8-15mA

脉冲信号的频率要求不大于 200KHz.   The frequency of the impulse signal shall not be larger than 200KHz.

脉冲信号的宽度要求不小于 2μS.   The width of the impulse signal shall not be less than 2μS.

脉冲信号的驱动电流要求为 8-15mA.   The drive current of the impulse signal shall be 8-15mA.

脉冲宽度≥200KHz，脉冲频率≤2μS，占空比可任意. Pulse frequency ≥200KHz; Pulse width ≤2μS; Pulse duty factor is at discretion.
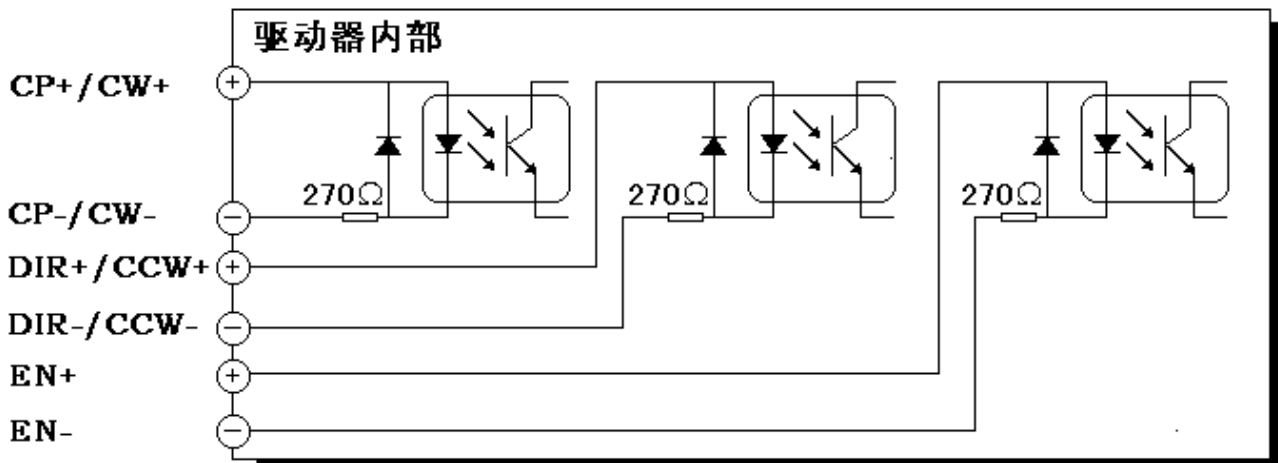
此沿为有效沿　This edge is valid edge.

脉冲电平-高电平　　Impulse level-High level

脉冲电平-低电平　　Impulse level-Lower level

4.2 Direction level signal DIR

The direction level signal DIR is used for controlling the rotation direction of the step motor. When this terminal is at high level, the motor rotates in one direction. When this terminal is at low level, the motor rotates in another direction. We call this commutation mode as single pulse mode. In addition, there is two pulse commutation mode: The driver receives the impulse signal from two circuits (Marked as **CW** and **CCW**). When one circuit (such as CW) has impulse signal, the motor rotates in positive rotation. When another circuit (such as CCW) has impulse signal, the motor rotates in reversal direction. The 5th step switch decides which state is used. The rotation direction of the motor can be changed only after the motor stops. The commutation signal must be issued after the last CP impulse in previous direction is finished and before the first CP impulse in another direction is issued (see following drawing).

驱动器输入信号内部接口示意图

4.3 Off-line level signal EN

After the driver is energized, the step motor is at the lock-out state (when not applied with CP impulse) or the running state (when applied with CP impulse). But when the user wants to regulate manually the motor, and does not want to disconnect the driver power, how to solve this problem? This signal can be used at this time. When this signal is in active (low level active), the motor is at free state without moment. When this signal is at high level or not connected, cancel the off-line state. This signal can be used by the user in option. If this function is not needed, this terminal shall not be connected.
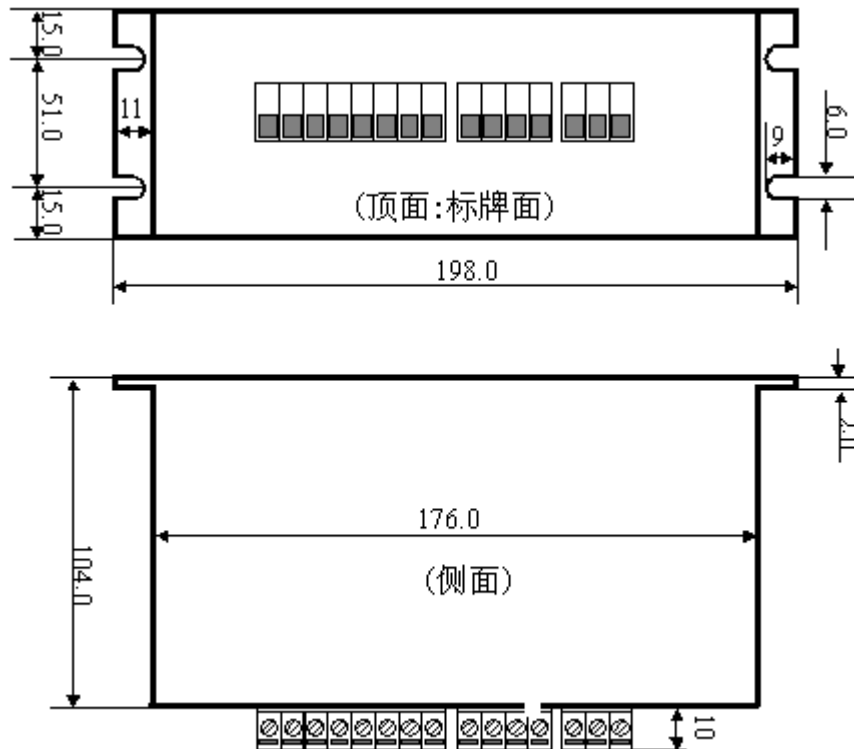
5. Power description

WZM-2H130MK driver requires a AC 110V power from outside. The current is based on the phase current of the motor. In general, the current shall be as same as the phase current of the motor. If the motor speed is low, the lower driving voltage is selected. If the motor speed is higher, the higher driving voltage is selected. We provide matched transformers and welcome ordering.

6. Description on indicators

There are two indicators on the driver: Power indicator (Green) and Not ready indicator (Red). After the driver is energized, the power indicator is on. If the protection action occurs on the driver, the not-ready indicator is on. (There are protective circuits of over current and over heating etc. inside the driver.).

7. External dimensions: Please refer to following drawing.

顶面: 标牌面   top face: label

侧面 side face

8. Frequently asked questions

8.1 When the rotation direction of the step motor is opposite to the direction required by me,

how can I adjust it？

Change the direction signal of the control system, or adjust the motor connection so as to change the rotation direction. The details are as follows:

For the motor with two-phase four wires, it is needed only to exchange one phase wire of the motor and then insert it into the driver. For instance: A+ and A- are exchanged each other.

8.2 If the motor is two-phase, four-phases, 6 wires and 8 wires, but the driver only needs 4 wires, how can I connect them？

Four-phase mixture motor is called also as two-phase mixture motor, with only difference that the outlet wires of four-phase motor have many connection methods. For two-phase 4 wires motor, the motor can be connected directly with the driver. For four-phase 6 wires motor, the tapped two wires are not used, other 4 wires are connected with the driver. For four-phase 8 wires motor, usually two coils are connected in parallel and then connected together with the driver.

8.3 How to calculate the pace angle of the motor after subdivide?

For two phases and four-phases motor, the pace angle after subdividing is equal to the complete pace angle of the motor divided by subdivide number. For instance, the step number per rotation is set as 400 steps, use 0.9 kWh /1.8 kWh motor, the subdivide pace angle is 360º/400=0.9º. If the step number per rotation is set as 6000 steps, use 0.9 kwh /1.8 kwh motor, the subdivide pace angle is 360º/6000=0.06º.

8.4 The noise of the motor is particularly high, the motor is weak and is vibrating？

If such thing occurs, the step motor works at the vibration region. In general, this problem can be solved by changing the input signal frequency CP.

8.5 The motor is normal at slow running, when the frequency is a little higher, the locked rotor phenomena occurs.

Under such a situation, it is usually that the supply voltage on the driver is not high enough. When the input voltage is adjusted to be larger, such problem can be solved. It shall be noticed that the voltage shall not be higher than the maximal voltage marked on the driver power end. Otherwise, the driver may be burnt. If the original supply voltage is AC 60V, the AC 110V power can be used.

8.6 After the driver is energized, the motor is vibrating and can not rotate.

If such thing occurs, first of all, check the connection between the motor winding and the driver for mistake. If the connection is correct, check the input frequency if it is too high. Refer to 8.7. The brief introduction of motor speed adjusting can solve this problem. If the problem can not be solved, the driver may be burnt. Please contact our company.
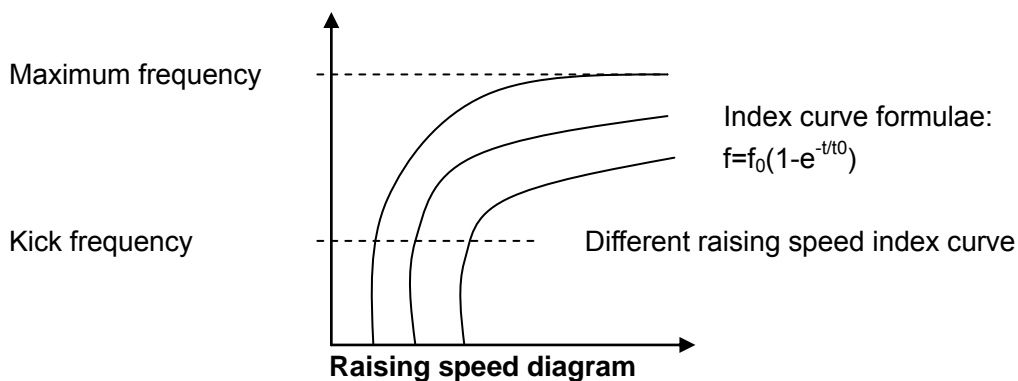
8.7 Brief introduction of speed adjusting:

The speed of the step motor is adjusted by changing the input impulse signal. In theory, it is needed only to apply the impulse signal on the driver. When each impulse (CP) is applied on the driver, the step motor rotates one pace angle (One subdivide pace angle in subdivide). But in fact, if impulse CP signal changes too fast, due to the inertia, the step motor can not keep up with the signal change. The locked rotor and loss step phenomena may occur. As a result, when the step motor starts, the raising

speed process must be needed. The speed reduction process must be needed when stopping. In general, the rule of raising speed and decelerating is same. It is introduced here with raising speed as the example:

The raising speed process is composed of kick frequency plus speed raising curve (Decelerating process in reverse). The kick frequency means the pulse starting frequency applied suddenly when the step motor is at stationary state. This frequency shall not be too large, otherwise, the locked rotor and loss step phenomena may occur also. The speed up and down curve is the index curve or the index curve adjusted in general. The straight curve or sine curve etc. may be adopted also. The user shall select suitable kick frequency and speed up and down curve according to the load. It is not easy to find an ideal curve. Several times of "test running" are needed in general. The index curve is comparatively complicated in actual software programming. In general, the time constant calculated in advance is stored in the computer storage and selected directly during operation.

The speed up and down design of the step motor is the major index of the control software. The design level will influence directly the operation stability of the motor, speed change velocity, motor operation noise, top speed, positioning accuracy (Under the condition that the product is used correctly, we can guarantee that the precision is100%). One special case is that: When the running speed of the step motor does not exceed the kick frequency, the speed up and down case will not exist.

Maximum frequency

Index curve formulae:
$f=f_0(1-e^{-t/t0})$

Kick frequency   Different raising speed index curve

Raising speed diagram

9. Marketing principle

With the principle of "Users in priority; credit first", we assist the user to solve the difficult problems occurred in use so that the users can use our products correctly. We are glad to discuss the application of our products on the system equipment in technical aspects with the users. The guarantee period of the product is one year. The product can be repaired on whole service life.